

# Lighting Design

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*Lighting design can enhance the function and appearance of a space. To achieve this, the lighting designer must identify—early in the process—both conceptual and actual design issues to be addressed before, during, and after construction.*

It is hard to think of a man-made place today that does not utilize light and lighting. Those responsible for these places often employ lighting designers. Architects can include this function in their work or, as specialists, provide this service to other architects, engineers, and other clients. Medium- to large-size firms might hire a lighting designer or designate someone on staff to be this specialist. When a firm offers this specialty as a service, it widens its potential market substantially. A short list of facilities that may benefit from lighting design includes the following:

- City neighborhoods, new communities, schools, resorts, and residences
- Parks, theme parks, sports complexes, stadiums, theaters, and recreation areas
- Industrial complexes, manufacturing facilities, and factories
- Hotels, hospitals, outpatient, and elder-care facilities
- Office buildings (both public and private), courthouses, libraries, and jails
- Department stores, shopping centers, and stores

Before the advent of the incandescent lamp in the late 19th century, the approach to architectural lighting relied heavily on daylighting that came through building elements such as windows, clerestories, skylights, and valances. Lighting was then an integral part of the architecture, and its consideration had a profound influence on building form and vice versa. Using daylighting as a starting point, the designer then added ornamental or decorative lighting, and—if needed—supplementary lighting from candles, gas lamps, and other nonelectric sources.

In the 20th century, daylighting approaches gave way to lighting solutions fueled by electric power, and design practice grew from a base of empirical theories to the science that shaped most lighting design installations in the Western world at midcentury. However, the energy crisis of the 1970s caused a reexamination of recommended lighting practices. Since then the use of daylighting has been rediscovered, energy conservation has become the guidepost of design, and energy conservation and care for the environment are universal concerns.

The single most significant problem in the design of any lighting system today generally lies in reaching an understanding of what is good lighting. Simply put, the lighting should be of benefit to a project—a part of the design for people and spaces. Today we live in a visual culture, and lighting plays a major role in seeing. Therefore, good lighting is defined at the beginning of each project with each client. There are no rules for good lighting.

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## Summary

### LIGHTING DESIGN SERVICES

#### **Why a Client May Need These Services**

- ▶ To improve worker productivity
- ▶ To promote merchandise or retail sales
- ▶ To highlight or reinforce architectural and spatial features
- ▶ To upgrade outmoded lighting systems
- ▶ To increase or ensure energy efficiency

#### **Knowledge and Skills Required**

- ▶ Knowledge of light sources and other lighting and control products
- ▶ Knowledge of how lighting relates to overall project design
- ▶ Familiarity with code requirements for lighting and energy standards
- ▶ Skilled in lighting calculations
- ▶ Knowledge of lighting analysis software programs
- ▶ Ability to demonstrate the economic benefit of good lighting to clients

#### **Representative Process Tasks**

- ▶ Preliminary research
- ▶ Advance plan analysis
- ▶ Design
- ▶ Project execution

## CLIENT NEEDS

Many factors that contribute to the success of an architectural project deal not with bricks and mortar but with immeasurable—often intangible—qualities that the layperson may not always be able to articulate but can recognize when they are present, such as feelings of safety, friendliness, comfort, and humanity. Such concepts and feelings, which can be measured only by client satisfaction, represent a unique realm of benefits that lighting design can bring to the client. These are qualities that can be created and enhanced by the imaginative use of light.

The architect has the closest relationship with clients in the building process and possesses the greatest overall understanding of the client's goals and objectives. Therefore the architect has the best chance of being able to articulate the benefits and value of lighting design for a project and to communicate the role of lighting throughout the design process. Clients need this advice, just as they need advice on other aspects of the project. Some of this advice may relate to:

- Reinforcing the functionality of the spaces within a project
- Adding to the acceptability/appreciation of the spaces by the occupants
- Adding to the value of a project
- Creating a feature that assists in the sale/rental of the spaces
- Promoting worker productivity and/or merchandise or property sales
- Reducing long-term expenses
- Minimizing customer dissatisfaction

Lighting generally represents from 1 to 3 percent of project construction costs. Lighting design fees are based on a percentage of the architect's fee or construction costs; however, because the lighting designer's work occurs largely in the concept, schematic design, and design development phases of a project, these fees generally fall due earlier than those of the architect.

## SKILLS

Lighting systems serve to reveal or reinforce the functions of the spaces being occupied. However, because light is not a visible product, to describe the lighting aspects of these spaces adequately may require renderings, essays, and verbal presentations. The lighting designer needs to be a particularly good communicator. In addition to this skill, the nature of lighting design requires the lighting designer to have these characteristics:

- Open-mindedness, skepticism, and curiosity. (Lighting is almost intangible and, as a consequence, a most elusive part of architecture. It has a language of its own.)
- Knowledge of all aspects of a project and what role lighting plays in its success.
- The ability to demonstrate the economic benefit of good lighting to the client.
- Knowledge of energy codes and other related codes and standards.
- Knowledge of light sources and other lighting and control products.
- Skill in lighting calculations and knowledge of lighting analysis software programs.

## PROCESS

Every lighting design project is as different as the individuals we design them to serve, and the client's goals and objectives must be defined at the start of every project. There are no prescribed answers. To arrive at a reasonable solution, it is essential that the client and design team work together. Only then can the unique characteristics that distinguish the client's requirements be identified. This essentially involves sifting through ideas and examples to narrow the decisions to just one solution.

Statistical and numerical data may describe the complexity of the human visual system, but lighting design done "by the numbers" cannot adequately address personal perception. To find a visual solution that is deeply satisfying in human terms, we must use a process methodology that allows the client and all members of the design team to interact and evaluate

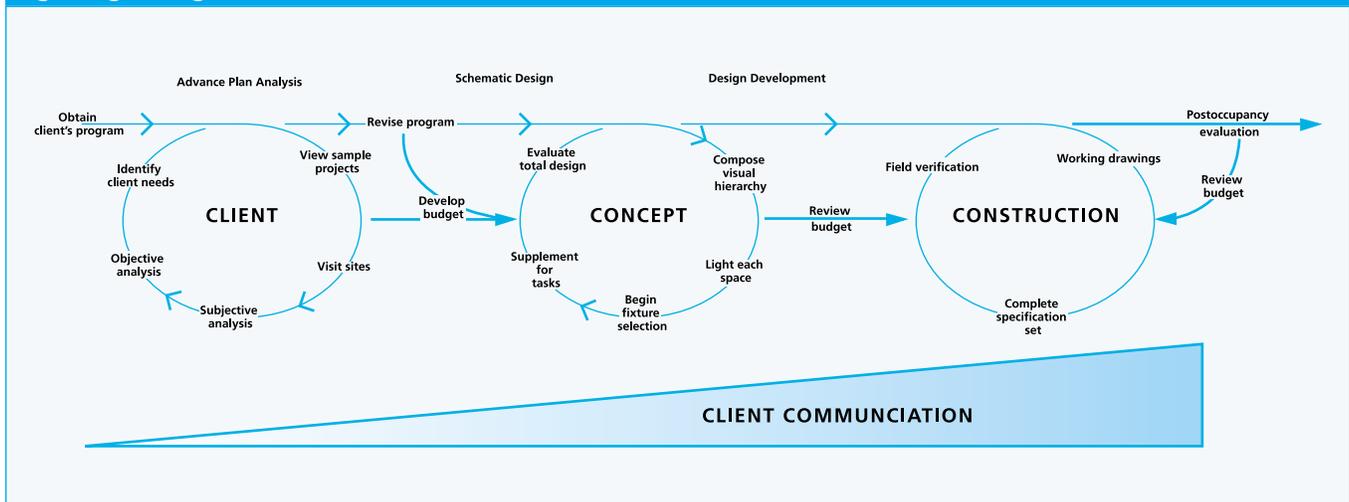
### *Certification for Lighting Design*

Some architects use the services of practitioners who specialize in lighting design. Others have elected to become qualified lighting practitioners themselves. Some do this by getting certification from the National Council of Qualifications for the Lighting Professions (NCQLP).

Such credentials are becoming increasingly necessary. At present there are only a few hundred qualified practitioners nationwide, yet the field is a burgeoning and lucrative specialty. Every year more clients—now including many government agencies and many major corporations—require NCQLP accreditation for lighting on all their projects. Some engineers are also discovering the economic value of adding an NCQLP certification to their other qualifications. For the architect it is a particularly attractive option.

The test is not arduous. Architects have already acquired many of the requisite skills and knowledge during the course of their education and through professional practice and experience. Once you have obtained certification you may discover that lighting design may not merely be a professional additive to a career in architecture. It could be a career in itself, rewarding in every sense of the word.

## Lighting Design Process



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all potential design solutions both objectively and subjectively. The basic steps in this process include the following:

**Preliminary research.** Visits to the client's existing facilities and subsequent analyses of the client's current lighting are vital to any project. They educate you and the client and help heighten awareness about the role of lighting in the client's enterprise. Thus the program is translated into a set of visual experiences rather than mere words. This research also alerts the designer to the degree of difficulty that the project presents, e.g., whether some potential solutions will require variances from the code in order to achieve a successful completion of the job.

**Advance plan analysis.** This increment of lighting design is directed toward defining the parameters and requirements of the project. It involves performing subjective analysis, objective analysis, and other activities. *Subjective analyses* should be performed with the client's staff at each location. Sample questions follow:

- Do you like your workspace, and why?
- Is the lighting appropriate for the space and for the function, and why?
- Is it comfortable to work here, and why?
- What would you change if you could, what would you keep, and why?

Seek solutions by noting preferences as well as problems.

*Objective analysis* consists of noting building materials for selected project spaces and measuring illuminance of the general surround, local surround, and task locations in transition, linger, and other areas. Other advance plan analysis tasks include identifying and describing specific aspects of the sites visited that relate appropriately to the project's needs and eliminating those that don't, establishing a budget, and revising or updating the project program based on actual observations and findings.

**Design.** In schematic design, a lighting composition of all spaces should be begun in concept. By the time schematic design nears completion, the lighting concept should be well developed. A visual hierarchy or itinerary through the project is set, each space is lighted to suit project needs, and all lighting and control equipment is selected.

In *design development*, once the concept is approved, a final selection of all equipment is made and a complete lighting quantification is carried out. Surround, local, and background illuminances are calculated. Supplementary lights should be added at this point, if required for specific tasks. Then adjustments should be made to ensure that all program goals—including budgets—have been met.

**Project execution.** This increment comprises activities and tasks to describe and specify the lighting design, to oversee its installation during construction, and to verify its effectiveness in actual use.

▶ **Beauty, Aristotle is quoted as saying, is a greater recommendation than any letter of introduction. Marlene Dietrich was in total agreement. She never stepped before the cameras unless her favorite cinematographer was in charge. "He knows how to light me," Dietrich said. "He makes me look beautiful." Dietrich knew that if beauty lies in the eyes of the beholder, the perception of beauty—that most subjective judgment—often lies in the hands of the one who controls the lighting.**

*Construction documentation.* A set of working drawings accurately locates each luminaire, identifies its focus, and indicates its type. A comprehensive set of specifications leaves no doubt as to the photometric properties of each luminaire, including its distribution and viewed photometric brightness.

*Construction phase.* A thorough review of the submitted shop drawings determines if everything required in the specifications is provided. Careful field observation of the installation in progress checks for compliance with the location, lamping, and focus indicated in the construction documents.

*Project follow-up.* Postoccupancy evaluation services—either in the context of the total building or only for the lighting—can determine the extent to which the installed lighting system meets project goals. If it falls short, adjustments can be made.

Throughout the design process, the architect works closely with the client's maintenance and purchasing personnel. Their cooperation and understanding are crucial if they are to be motivated to provide proper servicing after the architect has left the scene.

You may already have gone through many of the activities—budget, site observation, and so on—in your role as architect. Now think them through again in your role as lighting designer. Good lighting isn't an add-on, some cosmetic touch with which to endow a finishing gloss. Good lighting is an integral part of the architecture right from the start.

Now more than ever, clients are demanding a greater range of skills, extra services, and better services. Whether a sole practitioner or a member of a firm, today's architect needs a competitive edge to be on top of the profession. Indeed, professional lighting credentials could well be the decisive factor in the scramble to obtain good commissions. The architect who can add the LC (lighting certified) designation after his or her name to show National Council of Qualifications for the Lighting Professions (NCQLP) accreditation has a competitive edge.

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The AIA provides a contract document designed especially for alternative architectural services.

**B102–2007, Standard Form of Agreement Between Owner and Architect without a Predefined Scope of Architect’s Services.**

AIA Document B102–2007 is a standard form of agreement between owner and architect that contains terms and conditions and compensation details. B102–2007 does not include a scope of architect’s services, which must be inserted in Article 1 or attached as an exhibit. Special terms and conditions that modify the agreement may be included in Article 8.

The separation of the scope of services from the owner/architect agreement allows users the freedom to append alternative scopes of services.

AIA Document B102–2007 replaces and serves the same purpose as AIA Document B141–1997 Part 1.

For more information about AIA Contract Documents, visit [www.aia.org/contractdocs/about](http://www.aia.org/contractdocs/about)

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